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Murowaki et al.

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(54) **ELECTRONIC PART AND ELECTRONIC CONTROL UNIT**

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H01H 85/20 (2006.01)

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CPC ***H01H 85/201*** (2013.01)

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USPC 361/15, 103, 104, 275.4, 628, 630, 642, 361/646, 738, 766, 783; 337/33, 157, 158, 337/159, 168
See application file for complete search history.

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(57) **ABSTRACT**

A main body of an electronic part is supported by terminals at a position above and separated from a board surface of a printed board. Each of the terminals is composed of a supporting member made of electrically insulating material and a wiring member. Each of the wiring member has an electrode-connected portion electrically connected to an electrode formed on the main body and a land-connected portion electrically connected to a land formed in the printed board. One of the wiring members is composed of a fuse wiring member having a cut-off portion, which is melted down when excess current flows. The wiring member is outwardly expanded in a direction opposite to the main body.

9 Claims, 5 Drawing Sheets

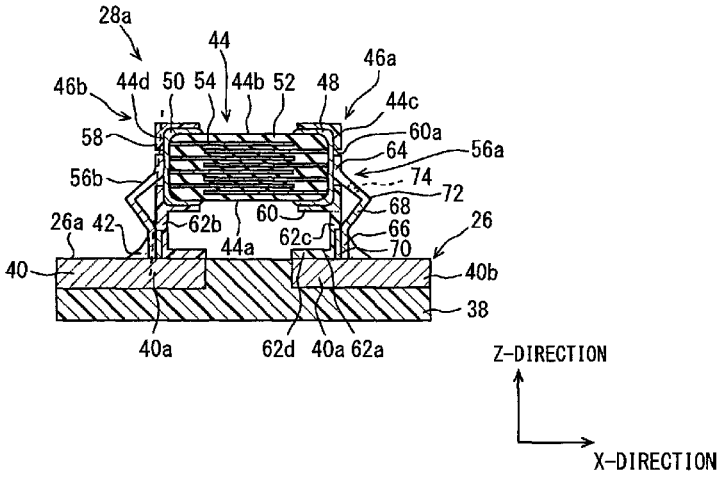

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FIG. 1

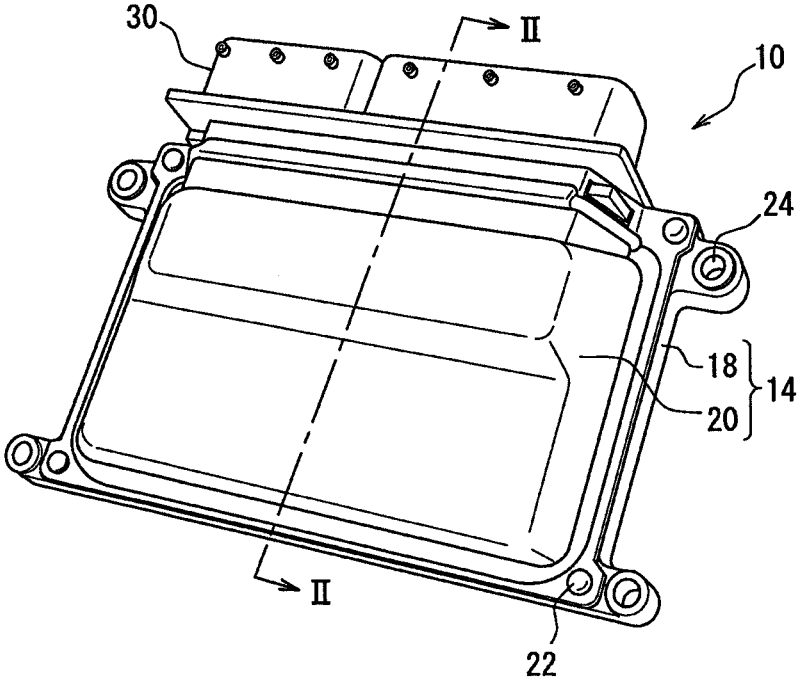

30
II
10
24
18
20
14
II
22

FIG. 2

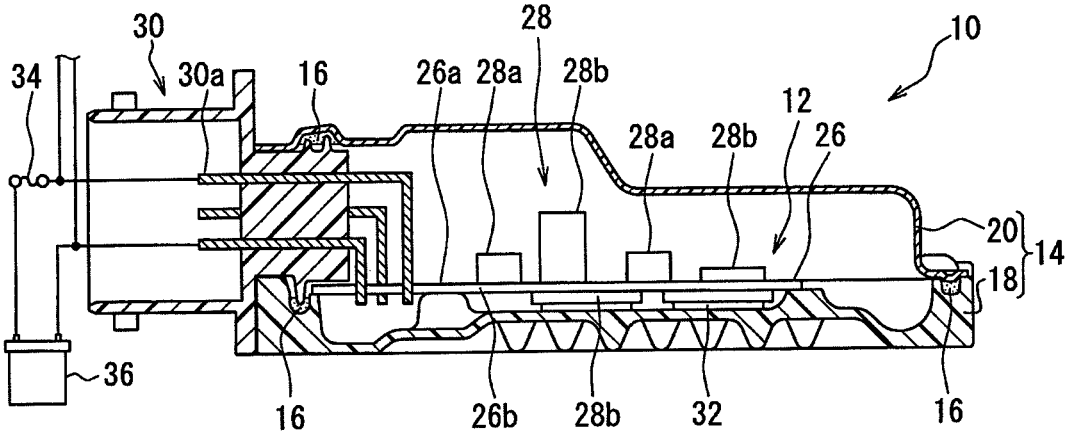

30
34
30a
16
26a
28a
28
28b
10
12
28a
28b
26
20
14
18
36
16
26b
28b
32
16

FIG. 3

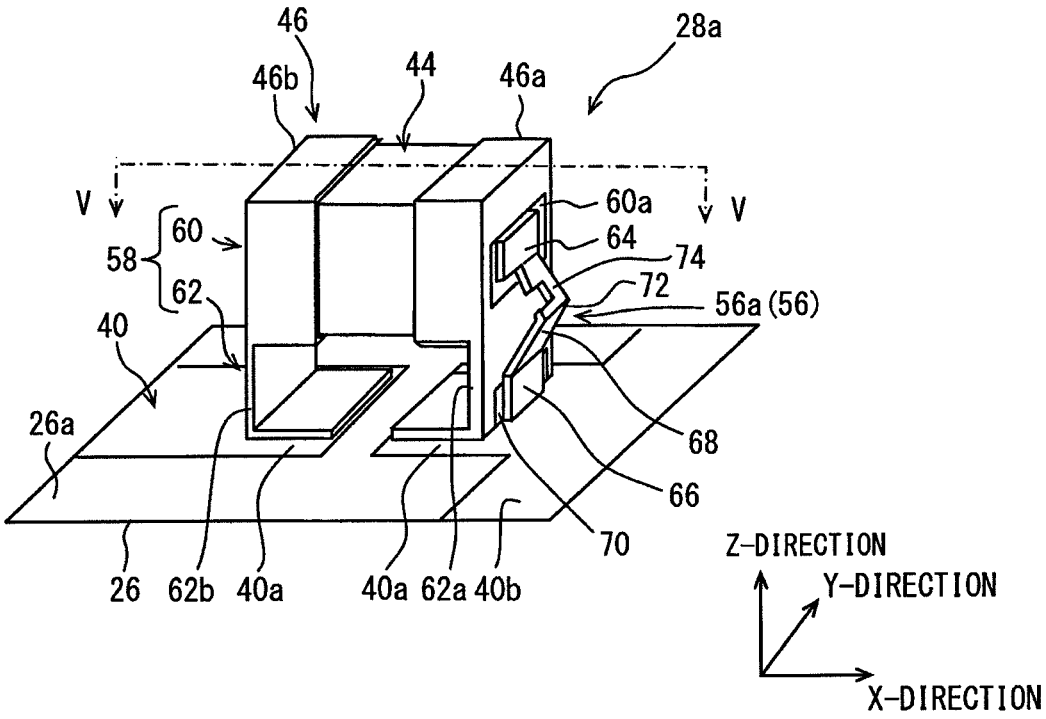

46
46b
44
46a
28a
V
V
60
58
62
60a
64
74
72
56a (56)
40
26a
68
66
70
26
62b
40a
40a
62a
40b
Z-DIRECTION
Y-DIRECTION
X-DIRECTION

FIG. 4

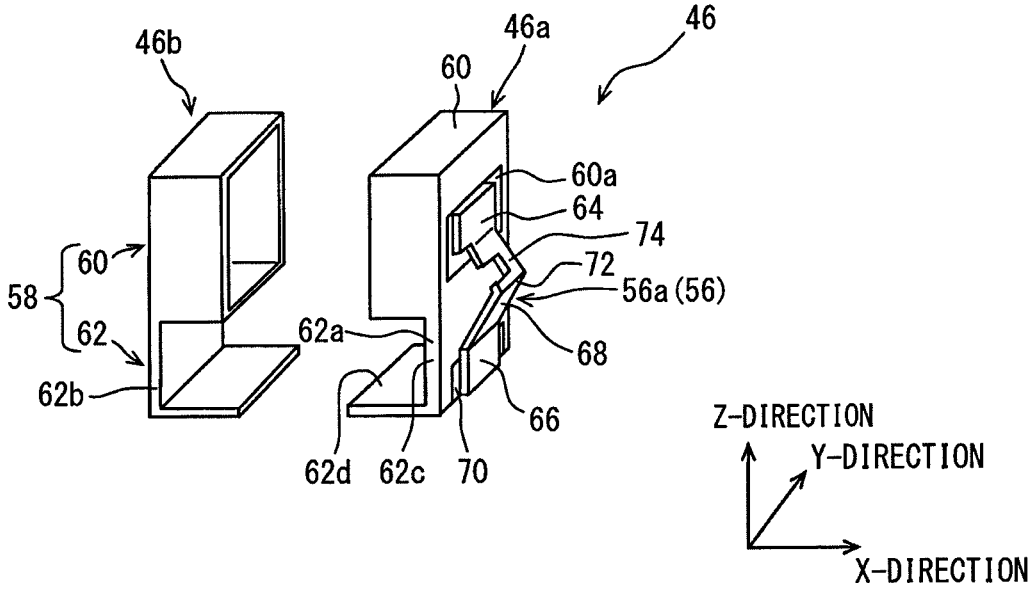

46b
46a
46
60
60a
64
74
72
56a (56)
58
60
62
62a
68
62b
66
62d
62c
70
Z-DIRECTION
Y-DIRECTION
X-DIRECTION

FIG. 5

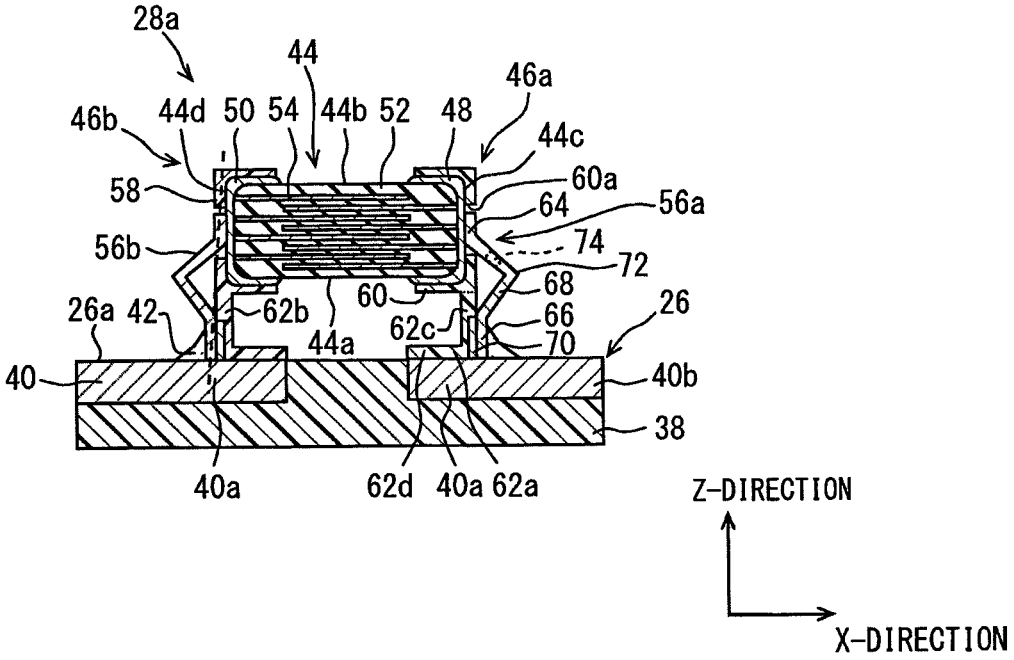

28a
44
46a
46b
44d
50
54
44b
52
48
44c
58
60a
64
56a
56b
74
72
60
68
26a
42
62b
44a
62c
66
26
70
40
40b
38
40a
62d
40a
62a
Z-DIRECTION
X-DIRECTION

FIG. 6

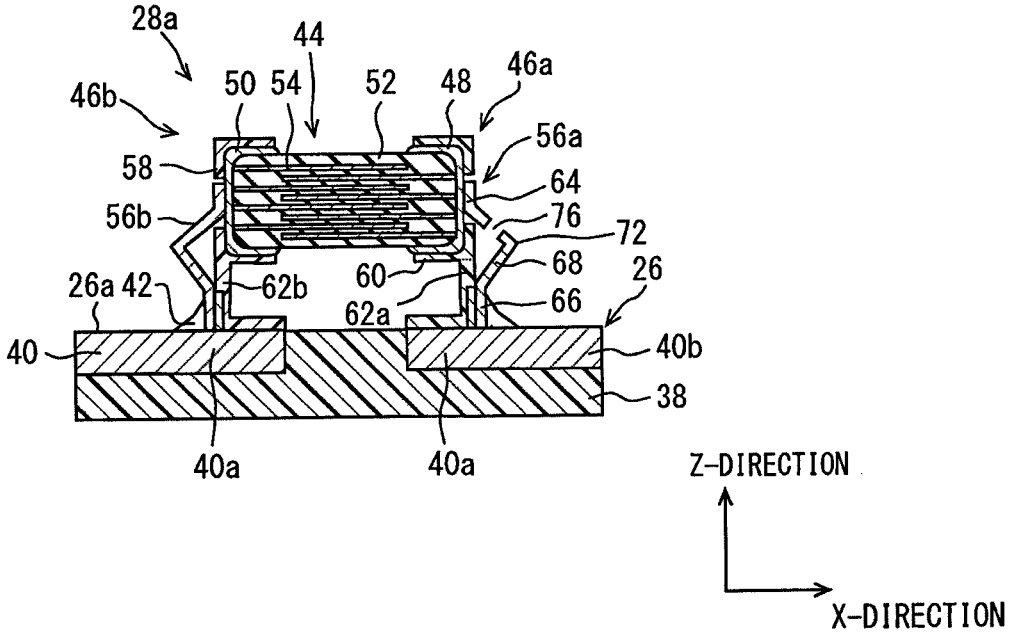

28a
44
46a
46b
50
54
52
48
56a
58
64
56b
76
72
68
60
26
26a
42
62b
66
62a
40
40b
38
40a
40a
Z-DIRECTION
X-DIRECTION

FIG. 7

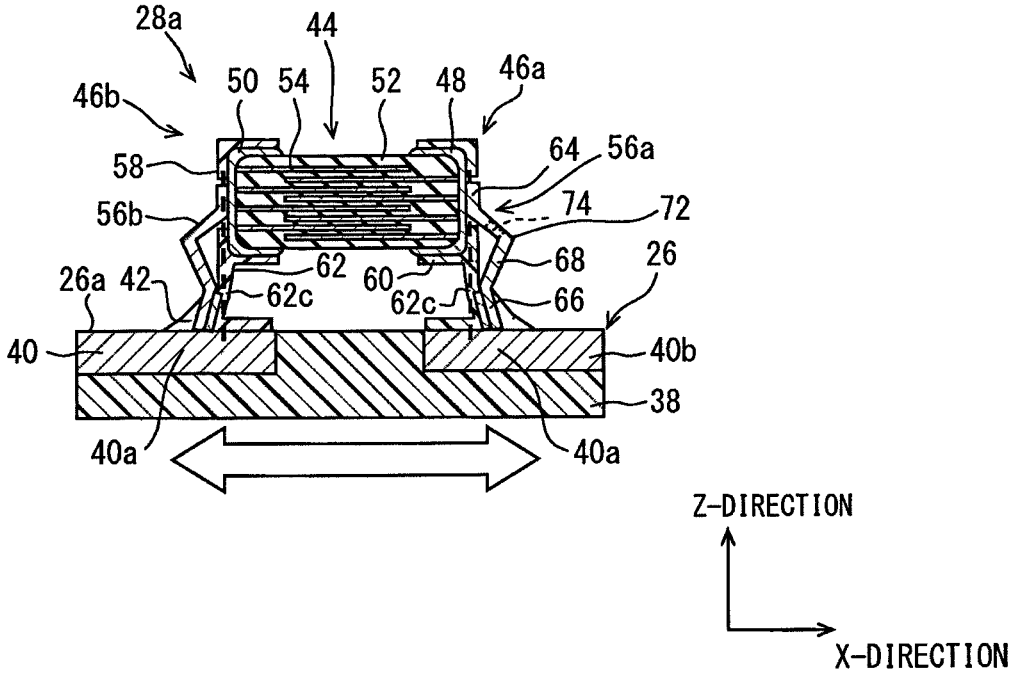


FIG. 8A

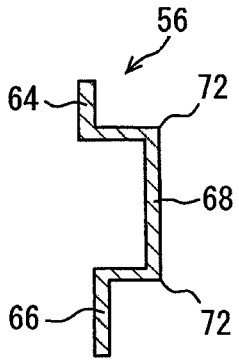


FIG. 8B

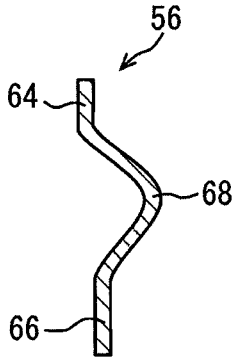


FIG. 9

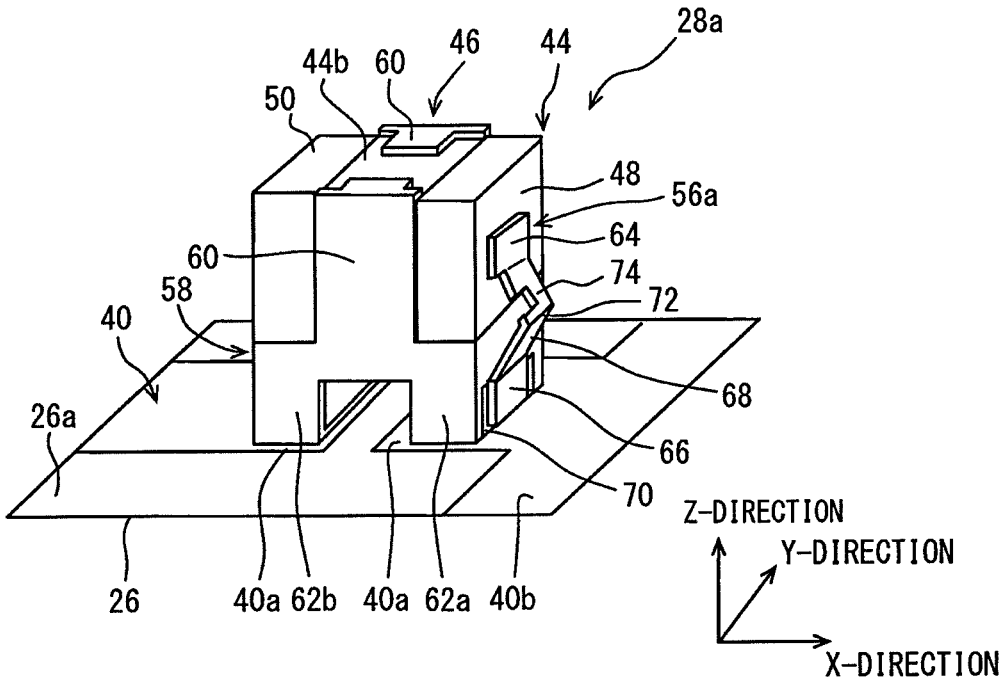
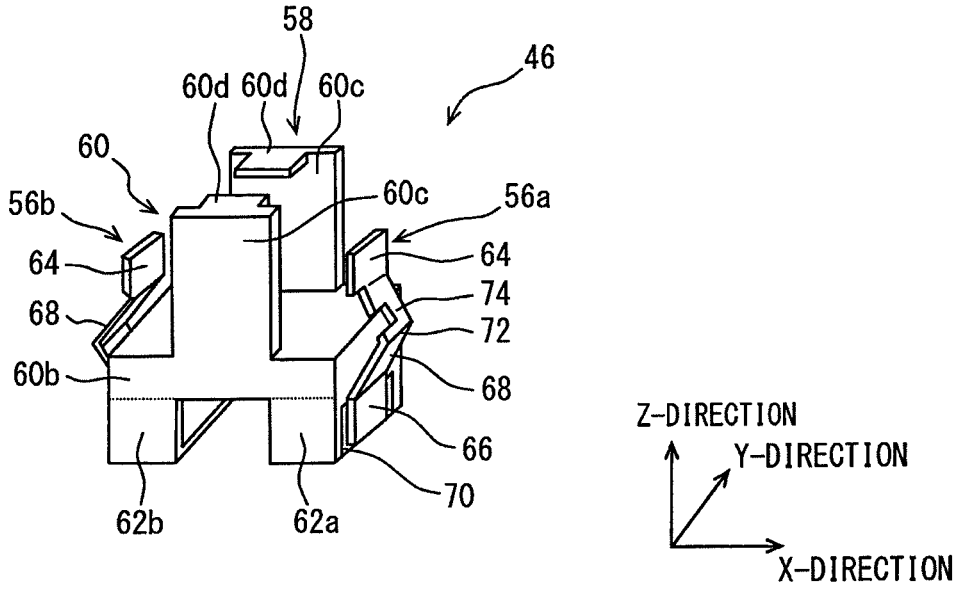

28a
44b
60
46
44
50
48
56a
64
60
74
58
72
40
68
26a
66
70
Z-DIRECTION
Y-DIRECTION
26
40a
62b
40a
62a
40b
X-DIRECTION

FIG. 10


58
46
60d
60d
60c
60
56b
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64
74
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72
60b
68
66
70
62b
62a
Z-DIRECTION
Y-DIRECTION
X-DIRECTION

ELECTRONIC PART AND ELECTRONIC CONTROL UNIT

CROSS REFERENCE TO RELATED APPLICATION

This application is based on Japanese Patent Application No. 2013-038362 filed on Feb. 28, 2013, the disclosure of which is incorporated herein by reference.

FIELD OF TECHNOLOGY

The present disclosure relates to an electronic part mounted to a printed board and an electronic control unit having the electronic part.

BACKGROUND

A printed board having a pattern fuse, which is a part of wiring patterns formed in the printed board, is known in the art, for example, as disclosed in Japanese Patent Publication No. 2007-311467.

The pattern fuse is generally so formed as to be narrower than a remaining part of the wiring patterns. Therefore, for example, when a short-circuit occurs in an inside of an electronic device or an electronic part and thereby excess current flows, the pattern fuse is melted down due to heat generation in order that an electric pathway is cut off.

In a case of the pattern fuse, it is necessary to individually design the pattern fuses when the pattern fuses are used for different types of electronic parts or when the pattern fuses are used to the same type of the electronic part but ratings of the electronic parts are different from each other. As a result, it is difficult to commonalize or standardize the printed boards for different types of electronic control units. In other words, it is difficult to commonalize the printed boards and to simply change the electronic parts to be mounted to the printed board in order to use the same type of the printed board for the different types of the electronic control units (variation products).

In addition, it is difficult to make a size of the printed board as well as the electronic control unit smaller, because the pattern fuse (or pattern fuses) is provided on the printed board as a part of the wiring patterns.

In addition, since the pattern fuse is formed on a board surface of the printed board, it is a problem that melted-down portions of the pattern fuse may be connected again after the pattern fuse is melted down. In particular, re-connection of the melted-down portions is more likely to occur due to density growth of the printed board.

SUMMARY OF THE DISCLOSURE

The present disclosure is made in view of the above problems. It is an object of the present disclosure to provide an electronic part and an electronic control unit having the electronic part, according to which it is possible to commonalize and/or standardize a printed board, to which the electronic parts are mounted, and to make a size of the printed board smaller. In addition, re-connection of melted-down portion of a fuse portion is prevented.

According to a feature of the present disclosure, an electronic part mounted to a printed board has a main body arranged at a position above and separated from a board surface of the printed board and the main body has at least one electronic element and multiple electrodes for the electronic element. The electronic part has a terminal for supporting the main body at the position above and separated from the board surface of the printed board, wherein the terminal electrically connects one of the electrodes to a corresponding land formed in the printed board.

The terminal comprises;

a supporting member made of electrically insulating material and having one end in contact with the main body and another end in contact with the board surface of the printed board in order to support the main body at the position above and separated from the board surface; and

a wiring member having an electrode-connected portion connected to one of the corresponding electrodes of the main body and a land-connected portion soldered to the land in a condition that the main body is supported at the position above and separated from the board surface.

The supporting member comprises;

a holding portion made of the electrically insulating material and being in contact with the main body for holding the main body; and

a leg portion extending from the holding portion to the printed board, the leg portion being elastically deformable in a direction in which the multiple electrodes are arranged.

The wiring member comprises;

the electrode-connected portion electrically and mechanically connected to the corresponding electrode of the main body;

the land-connected portion connected to the leg portion and soldered to the land; and

a connecting portion for electrically connecting the electrode-connected portion to the land-connected portion.

The wiring member is composed of a fuse wiring member, and

the fuse wiring member has a cut-off portion, which is formed at least as a part of the connecting portion and which has a width smaller than that of other portions of the connecting portion, so that the cut-off portion is melted down depending heat generated by excess current in order to cut off the excess current.

According to the above feature, the terminal is provided in the electronic part, one of the wiring members is composed of the fuse wiring member having the cut-off portion. Therefore, it is possible to commonalize the printed boards, which can be used for different types of the electronic control units. In addition, it is possible to reduce a size of the printed board and the electronic control unit by such a volume corresponding to a fuse terminal, which can be eliminated in the present disclosure.

Furthermore, according to the above feature, the cut-off portion is formed as a part of the connecting portion of the fuse wiring member. As a result, the cut-off portion is supported at the position above and separated from the board surface of the printed board. It is, thereby, possible to prevent such a situation that the melted-down cut-off portion is connected again.

In particular, according to the present disclosure, a wiring function for connecting the electrodes to the lands and a supporting function for supporting the main body above the board surface are independently provided in the wiring member and the supporting member. As a result, even when the cut-off portion is melted down, it is possible to support the main body by the supporting member. It is, therefore, possible to effectively prevent re-connection of the fuse wiring member.

In addition, according to the above feature, the supporting member is elastically deformable in the direction, in which the electrodes are arranged. When a difference of expansion and contraction (a relative displacement) is generated

between the printed board and the main body by a difference of linear coefficient of expansion, the supporting member is elastically deformed. As a result, it is possible to reduce stress applied to connected areas between the wiring members and the electrodes and stress applied to connected areas between the wiring members and the lands.

According to another feature of the present disclosure, the connecting portion is outwardly expanded in a direction opposite to the main body from a virtual line connecting the electrode-connected portion and the land-connected portion with each other.

According to the above feature, when the printed board is expanded with respect to the main body depending on increase of ambient temperature and the leg portion of the supporting member is elastically deformed, the connecting portion can be also elastically deformed in accordance with the deformation of the leg portion. Since the connecting portion has a flexible structure for absorbing the elastic deformation of the leg portion as above, it is possible to further increase reliability for the mechanical and electrical connection between the electrodes and the lands.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present disclosure will become more apparent from the following detailed description made with reference to the accompanying drawings. In the drawings:

FIG. **1** is a perspective view schematically showing a structure of an electronic control unit according to a first embodiment of the present disclosure;

FIG. **2** is a schematic cross sectional view taken along a line II-II in FIG. **1**;

FIG. **3** is a schematically enlarged perspective view showing a portion of a printed board (an electronic part mounted to the printed board);

FIG. **4** is a schematic perspective view showing terminals;

FIG. **5** is a schematic cross sectional view taken along a line V-V in FIG. **3**;

FIG. **6** is a schematic cross sectional view in which a cut-off portion of FIG. **5** is melted down;

FIG. **7** is a schematic cross sectional view for explaining an effect of the first embodiment for reducing stress;

FIGS. **8**A and **8**B are schematic views, each of which shows a modification of a wiring member;

FIG. **9** is a schematically enlarged perspective view showing a portion of a printed board according to a second embodiment, wherein FIG. **9** corresponds to FIG. **3**; and

FIG. **10** is a perspective view schematically showing a structure of a terminal unit, wherein FIG. **10** corresponds to FIG. **4**.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The present disclosure will be explained hereinafter byway of multiple embodiments. The same reference numerals are given to the same or similar portions and/or structures throughout the embodiments, for the purpose of eliminating repeated explanation.

First Embodiment

An electronic control unit **10** shown in FIGS. **1** and **2** has a circuit board **12** as a main part thereof. The electronic control unit **10** further has a housing **14** for accommodating the circuit board **12** and a seal element **16**. In the present embodiment, the electronic control unit **10** is formed as an electronic control unit (ECU) of a water-proof type for controlling an operation of an engine for a vehicle.

An outline structure for the electronic control unit **10** will be hereinafter explained.

The housing **14** is made of metal, such as, aluminum, iron or the like, or resin material, for accommodating therein the circuit board **12** so as to protect the same from water, dust and so on. A number of parts for forming the housing **14** is not limited to a specific number, so that the housing **14** may be composed of one or multiple members.

As shown in FIG. **2**, according to the present embodiment, the housing **14** is composed of two parts, that is, a lower casing **18** of a shallow-box shape having an upper open end and an upper casing **20** for closing the upper open end of the lower casing **18**. The upper casing **20** is fixed to the lower casing **18** by multiple screws **22** (or bolts) to form an inside space of the housing **14** for accommodating the circuit board **12**. In an assembled condition of the housing **14**, a portion (or multiple portions) of the circuit board **12** is directly or indirectly interposed between the lower and the upper casings **18** and **20**, so that the circuit board **12** is firmly held at a predetermined position inside of the housing **14**.

In the present embodiment, the housing **14** is divided into the lower and the upper casings **18** and **20** in a vertical direction (a thickness direction of the circuit board **12**). However, a dividing direction for the parts (the lower casing **18** and the upper casing **20**) of the housing **14** is not limited to the vertical direction.

Multiple through-holes **24** (four in the present embodiment) are formed at each corner of the lower casing **18** in order that screws or bolts (not shown) are respectively inserted into the through-holes **24** so as to fix the electronic control unit **10** to a predetermined position, for example, to an engine block. An aperture is formed in the housing **14** so that a portion of a connector **30** outwardly protrudes from the inside of the housing **14**.

The seal element **16** has a function for preventing water from coming into the inside space of the housing **14**. As shown in FIG. **2**, the seal element **16** is arranged at a position, at which outer peripheries of the lower and the upper casings **18** and **20** are opposed to each other. The seal element **16** is also arranged at a position, at which the housing **14** and the connector **30** are opposed to each other.

The circuit board **12** is composed of a printed board **26**, to which multiple electric or electronic parts and/or components **28** (hereinafter collectively referred to as the electronic parts **28**), such as a micro-computer, power transistors, resistors, capacitors and the like are mounted to form electric circuits. The electronic parts **28** are mounted to at least one of board surfaces (a front-side board surface **26***a* and a back-side board surface **26***b*) of the printed board **26**. In the present embodiment, as shown in FIG. **2**, the electronic parts **28** are mounted to both of the board surfaces **26***a* and **26***b* of the printed board **26**.

For example, multiple electronic parts **28***a* are mounted to the front-side board surface **26***a* of the printed board **26**, wherein each of the electronic parts **28***a* has a fuse terminal **46***a* (FIGS. **3** and **4**), as explained below. The electronic parts **28***a* correspond to those electronic parts requiring the pattern fuses in a conventional device. The electronic parts other than the electronic parts **28***a* (having the fuse terminal **46***a*) are designated by **28***b* (having no fuse terminal) in the drawing, for the sake of convenience.

In addition to the electronic parts **28**, the connector **30** is further mounted to the printed board **26** for electrically connecting the electric circuits formed in the circuit board **12** to

outside devices (not shown). In FIG. **2**, multiple pins **30***a* of the connector **30** are mounted to the printed board **26** by a through-hole mounting process. However, the pins **30***a* may be alternatively mounted to the printed board **26** by a surface-mounting process or a surface-mounting structure.

A reference numeral **32** in FIG. **2** designates heat radiation gel arranged between some of the electronic parts **28***b* and the lower casing **18** and being in contact with them, so as to transfer heat of the electronic parts **28***b* to the lower casing **18**.

In the above-explained electronic control unit **10**, an outside connector (not shown) is fitted to the connector **30** (the pins **30***a* of the connector **30**), so that the electronic control unit **10** is electrically connected to a wire harness (not shown). The connector **30** is electrically connected to a battery **36** (a direct current power source) via a main fuse **34** for protecting the electronic control unit **10** from excess current. The battery **36** is also connected to other electronic control units (not shown), such as a brake control ECU, a steering control ECU, a body ECU, a navigation device and so on.

Since the main fuse **34** is provided in a path for supplying electric power necessary for operating the various kinds of the electronic devices, including the electronic control unit **10**, a large-size fuse (for example, a fuse element for 15 A, 20 A or the like) is used for the main fuse **34**. The main fuse **34** is melted down by the excess current larger than a predetermined value, when any defect or trouble occurs in any one of the electronic devices (including the electronic control unit **10**) and thereby the excess current flows through the main fuse **34**. Then, the power supply via the main fuse **34** is cut off to prevent an adverse effect to the other electronic devices.

The circuit board **12**, in particular, the electronic part **28***a*, will be explained more in detail with reference to FIGS. **3** to **5**. FIGS. **3** and **4** show relevant portions of the circuit board **12**, including the electronic part **28***a* and portions of the circuit board **12** neighboring to the electronic part **28***a* mounted to the printed board **26**.

In the present application, a direction, which is in parallel to the board surface **26***a* of the printed board **26** and in which electrodes **48** and **50** are arranged, is referred to as an X-direction. A direction parallel to the board surface **26***a* and perpendicular to the X-direction is referred to as a Y-direction. A direction perpendicular to the board surface **26***a*, that is a thickness direction of the printed board **26** is referred to as a Z-direction.

The printed board **26** is composed of an insulating board **38** made of resin or ceramics as its main material, and wiring patterns **40** made of conducting material (such as copper) and arranged on the insulating board **38**. Although not shown in the drawing, in the present embodiment, the wiring patterns **40** are formed in a multi-layer structure on the insulating board **38** and the wiring patterns **40** are formed at both board surfaces of the insulating board **38**.

A resist (not shown) is arranged on a board surface of the insulating board **38** (corresponding to the front-side board surface **26***a* of the printed board **26**) so as to cover the wiring patterns **40**. The resist has openings (not shown) at predetermined positions. A portion of the wiring patterns **40**, which is exposed to an outside of the printed board **26** via the opening of the resist, forms a land **40***a* connected to the electronic part **28** via solder **42**. The lands **40***a* are also arranged in the X-direction as in the same manner to the electrodes **48** and **50**.

Each of the electronic parts **28***a* has an electronic-element main body **44** and multiple terminals **46**.

The electronic-element main body **44** (hereinafter, the main body **44**) has at least one electronic element (a capacitor as explained below) and multiple electrodes **48** and **50** electrically connected to the electronic element and arranged at outer surfaces of the main body **44**. The main body **44** is arranged above the front-side board surface **26***a* of the printed board **26**. In other words, the main body **44** is held at a position which is separated from the board surface (from the front-side board surface in the present embodiment).

In the present embodiment, the circuit board **12** has multiple electronic parts **28***a*, one of which is composed of a ceramic-type laminated capacitor shown in FIG. **5**. As shown in FIG. **5**, the main body **44** of the electronic part **28***a* (the ceramic-type laminated capacitor) has dielectric layers **52** made of high-dielectric ceramics of a barium-titanate type and electric conductor layers **54**, wherein the dielectric layers **52** and the electric conductor layers **54** are alternately laminated. The electrodes **48** and **50** are connected to the electric conductor layers **54**.

As shown in FIG. **3**, an outer shape of the main body **44** of the electronic part **28***a* is formed in a rectangular shape on a plane, which is defined by the X-direction and the Y-direction, that is, a plane which is in parallel to the front-side board surface **26***a* of the printed board **26**. A longitudinal direction of the rectangular shape corresponds to the X-direction. The main body **44** has the electrodes **48** and **50** at its both longitudinal ends in the X-direction.

A reference numeral **44***a* designates a lower-side surface of the main body **44** facing to the front-side board surface **26***a*. A reference numeral **44***b* designates an upper-side surface, which is on an opposite side to the lower-side surface **44***a* in the Z-direction. A reference numeral **44***c* designates a first side surface of the main body **44** in the X-direction. A reference numeral **44***d* designates a second side surface, which is on an opposite side to the first side surface **44***c* in the X-direction. Although not designated by reference numerals, one of side surfaces of the main body **44** in the Y-direction and between the first and second side surfaces **44***c* and **44***d* is referred to a third side surface, while the other of the side surfaces opposite to the third side surface is referred to a fourth side surface.

The electrode **48** (also referred to as a first electrode) is formed at one of the longitudinal ends of the main body **44** including the first side surface **44***c*. More exactly, the electrode **48** is formed on the first side surface **44***c*, a part of the lower-side surface **44***a*, a part of the upper-side surface, a part of the third side surface and a part of the fourth side surface. The electrode **50** (also referred to as a second electrode) is formed at the other of the longitudinal ends of the main body **44** including the second side surface **44***d*. More exactly, the electrode **50** is formed on the second side surface **44***d*, another part of the lower-side surface **44***a*, another part of the upper-side surface **44***b*, another part of the third side surface and another part of the fourth side surface.

Each of the terminals **46** has a first function (a supporting function) for supporting the main body **44** at a position above and separated from the board surface **26***a* and a second function (a wiring function) for electrically connecting each of the electrodes **48** and **50** to the respective lands **40***a*. Each of the terminals **46** is connected to the respective electrodes **48** and **50** and has a wiring member **56** soldered to the land **40***a* in a condition that the main body **44** is supported at the position above the board surface **26***a*. Each of the terminals **46** has a supporting member **58** made of electrically insulating material. The supporting member **58** is in contact with (connected to) the main body **44** and the board surface **26***a* so as to support the main body **44** at the position above the board surface **26***a*. As above, the terminal **46** is not made of one element having both of the supporting function and the wiring function, but the terminal **46** is composed of the supporting

member **58** having the supporting function and the wiring member **56** having the wiring function.

In the present embodiment, the terminals **46** are composed of the fuse terminal **46***a* connected to the first electrode **48** and a normal terminal **46***b* connected to the second electrode **50**.

Each of the supporting members **58** has a holding portion **60**, which is in contact with the main body **44** for holding it at the position above the board surface **26***a*. At least, a contacting portion of the holding portion **60** is made of the electrically insulating material. Each of the supporting members **58** has a leg portion **62** extending from the holding portion **60** in the Z-direction toward the board surface **26***a*. The leg portion **62** is deformable in the X-direction.

Each of the supporting members **58**, except for a fixing portion **70** (explained below), is made of resin material. Each of the fuse terminal **46***a* and the normal terminal **46***b* has the supporting member **58**. Each of the holding portions **60** is formed in a box shape having an open end at its one side surface so as to hold each of the electrodes **48** and **50**. The holding portion **60** of the box shape has five inner walls, each of which faces to the respective outer surfaces of the main body **44** on which the electrode **48** or **50** is formed. A depth of the box-shaped holding portion **60** is almost equal to a length of the electrode **48** or **50** in the X-direction. Each of the electrodes **48** and **50** is press-inserted into the box-shaped holding portion **60**. Each of the electrodes **48** and **50** may be fixed to the holding portion **60** not by the press-insertion but by any other methods, such as adhesion, clipping, fitting and so on.

The holding portion **60** of the fuse terminal **46***a* has an opening **60***a* in a wall of the holding portion **60** facing to the first side surface **44***c* of the main body **44**, so that the electrode **48** is exposed to the outside through the opening **60***a*. In the same manner, the holding portion **60** of the normal terminal **46***b* has an opening **60***a* (not shown) in a wall of the holding portion **60** facing to the second side surface **44***d*, so that the electrode **50** is exposed to the outside through the opening **60***a*.

The leg portion **62** of the fuse terminal **46***a*, which extends from the holding portion **60** toward the printed board **26**, is referred to as a first leg portion **62***a*. The leg portion **62** of the normal terminal **46***b*, which extends from the holding portion **60** toward the printed board **26**, is referred to as a second leg portion **62***b*. Each of the leg portions **62** (**62***a*, **62***b*) extends from the holding portion **60** on a side of the lower-side surface **44***a* of the main body **44** in the Z-direction toward the printed board **26**. Each of the leg portions **62** (**62***a*, **62***b*) has a vertical wall portion **62***c* extending from the holding portion **60** in the Z-direction and a seat portion **62***d* bent at a lower end of the vertical wall portion **62***c* and extending in the X-direction toward the leg portion **62** of the opposite terminal **46**. The seat portion **62***d* is arranged on the board surface **26***a* and located at the corresponding land **40***a*. Each of the leg portions **62** (**62***a*, **62***b*) has a width in the Y-direction (a direction perpendicular to a wall extending direction), wherein the width is constant for its entire length. A thickness of each leg portion **62** (**62***a*, **62***b*) is also constant for its entire length. The vertical wall portion **62***c* is elastically deformable in the X-direction.

The wiring member **56** of each terminal **46** (**46***a*, **46***b*) has an electrode-connected portion **64** electrically and mechanically connected to each of the electrodes **48** and **50**. The wiring member **56** has a land-connected portion **66** fixed to the leg portion **62** (the vertical wall portion **62***c*) and soldered to the land **40***a*. Furthermore, each of the wiring members **56** has a connecting portion **68** for connecting the electrode-connected portion **64** and the land-connected portion **66** with each other. In the present embodiment, the wiring member **56** of the fuse terminal **46***a* connected to the electrode **48** is referred to as a fuse wiring member **56***a*, while the wiring member **56** of the normal terminal **46***b* connected to the electrode **50** is referred to as a normal wiring member **56***b*. Each of the wiring members **56** (**56***a*, **56***b*) is made of a metal plate having a constant thickness by punching out in a predetermined shape and bending it in a predetermined three-dimensional shape.

The electrode-connected portion **64** of each wiring member **56** is arranged in the opening **60***a* of the holding portion **60** and connected by solder (not shown) to the respective electrode **48** or **50**, each of which is exposed to the outside of the holding portion **60** via the opening **60***a*. More exactly, the electrode-connected portion **64** of the fuse wiring member **56***a* is connected to the electrode **48** formed on the first side surface **44***c* of the main body **44**, while the electrode-connected portion **64** of the normal wiring member **56***b* is connected to the electrode **50** formed on the second side surface **44***d* of the main body **44**.

The land-connected portion **66** is fixed to the vertical wall portion **62***c* of the leg portion **62**. In the present embodiment, the leg portion **62** has the fixing portion **70** made of metal on a side opposite to the other terminal **46** in the X-direction, wherein the fixing portion **70** extends from the lower end of the vertical wall portion **62***c* in the Z-direction and has a predetermined height. The fixing portion **70** is made of, for example, a metal foil attached to a surface of the vertical wall portion **62***c* made of resin. Alternatively, the fixing portion **70** is made by an insert-molding process so that the fixing portion **70** is integrally molded in the vertical wall portion **62***c* made of the resin. The land-connected portion **66** is connected to the fixing portion **70** of the leg portion **62** by solder (not shown). The land-connected portion **66** is further connected to the land **40***a* by the solder **42**, as shown in FIG. **5**.

The connecting portion **68** of each wiring member **56** extends in the Z-direction so as to connect the electrode-connected portion **64** and the land-connected portion **66** with each other. The connecting portion **68** is convexed in a direction opposite to the other terminal **46** in the X-direction. The connecting portion **68**, which has a bent portion **72**, is formed in a V-letter shape in a cross section on a plane defined by the X-direction and the Z-direction. The wiring member **56** is also bent at an upper-side boundary between the electrode-connected portion **64** and the V-shaped connecting portion **68** and a lower-side boundary between the land-connected portion **66** and the V-shaped connecting portion **68**.

A cut-off portion **74** is formed in the fuse wiring member **56***a* of the fuse terminal **46***a*. The cut-off portion **74** is formed as a part of the connecting portion **68**. The cut-off portion **74** is held at a position above and separated from the board surface **26***a* of the printed board **26**, in a condition that the fuse terminal **46***a* is soldered to the land **40***a*.

A width of the cut-off portion **74** is made smaller than that of the other portions of the connecting portion **68** of the fuse wiring member **56***a*, so that the cut-off portion **74** is melted down depending on heat due to excess current in order to cut off the excess current. The width is a dimension in the Y-direction, which corresponds to a direction perpendicular to both of a direction of current flow in the fuse wiring member **56***a* and a thickness direction of the connecting portion **68** of the fuse wiring member **56***a*. In the present embodiment, since the fuse wiring member **56***a* is made of the metal plate having the constant thickness by punching out the metal plate to the predetermined shape and bending it to the three-dimensional shape, a cross sectional area (on the plane perpendicular to the current flow) of the cut-off portion **74** is made smaller than that of the other portions of the fuse wiring

member **56***a*. The cut-off portion **74** is formed in the fuse wiring member **56***a* at a position closer to the electrode-connected portion **64** than the bent portion **72**. In other words, the cut-off portion **74** is formed at a position above the bent portion **72**.

The normal wiring member **56***b* has the same structure to that of the fuse wiring member **56***a*, except for the cut-off portion **74**. Namely, the normal wiring member **56***b* has no cut-off portion.

As shown in FIG. **3**, the fuse terminal **46***a* of the electronic part **28***a* is electrically connected to a power-source wiring pattern **40***b* via the land **40***a* and a connecting wiring pattern **40***c*. The power-source wiring pattern **40***b* corresponds to a part of the wiring patterns **40**, which is commonly used for multiple electronic parts **28** (including the electronic part **28***a*). The power-source wiring pattern **40***b* is electrically connected to the battery **36** via the pin **30***a* of the connector **30**.

A method of manufacturing the electronic part **28***a* and a method of mounting the electronic part **28***a* to the printed board **26** will be explained.

At first, the following parts are prepared;

the main body **44** having the electrodes **48** and **50**;

a pair of the supporting members **58**; and

a pair of the wiring members **56** (**56***a*, **56***b*), each having the predetermined shape with or without the cut-off portion **74**.

Then, the supporting members **58** are attached to the main body **44**. More exactly, the electrode **48** is press-inserted into the holding portion **60** of the supporting member **58** for the fuse terminal **46***a*. In the same manner, the electrode **50** is press-inserted into the holding portion **60** of the supporting member **58** for the normal terminal **46***b*.

The electrode-connected portion **64** of the fuse wiring member **56***a* is soldered to the electrode **48**, which is exposed to the outside through the opening **60***a* of the holding portion **60**. Then, the land-connected portion **66** is soldered to the fixing portion **70** of the first leg portion **62***a*. In the same manner to the above method, the electrode-connected portion **64** of the normal wiring member **56***b* is soldered to the electrode **50**, which is exposed to the outside through the opening **60***a* of the holding portion **60**. Then, the land-connected portion **66** is soldered to the fixing portion **70** of the second leg portion **62***b*. The electronic part **28***a* is thus completed.

The electronic part **28***a* is positioned on the board surface **26***a* of the printed board **26**, so that each of the seat portions **62***d* of the leg portions **62** is located on a corresponding land **40***a*. Then, the land-connected portion **66** and the land **40***a* are electrically and mechanically connected to each other by the solder **42**. As above, the electronic control unit **10** having the electric circuits is completed.

Advantages of the electronic part **28***a* and the electronic control unit **10** of the present embodiment will be explained.

In the present embodiment, the electrodes **48** and **50** of the electronic part **28***a* are not directly connected to the lands **40***a* via the solders **42**. Instead, the multiple terminals **46** (more exactly, the wiring members **56**) are provided between the electrodes **48** and **50** and the lands **40***a* so that each of the electrodes **48** and **50** is indirectly connected to the lands **40***a* via the wiring members **56**. In addition, one of the wiring members **56** for the terminals **46** is composed of the fuse wiring member **56***a* having the cut-off portion **74**. Accordingly, when short-circuit occurs in the electronic part **28***a* and thereby the excess current (short-circuit current) flows, the heat is generated at the cut-off portion **74** having the smaller width depending on the excess current. And when temperature at the cut-off portion **74** becomes higher than a predetermined value, the cut-off portion **74** is melted down and the electrical connection between the electrode **48** and the land **40***a* is cut off. As a result, a gap **76** is formed at a position, where the cut-off portion **74** existed before its melt-down. Accordingly, it is possible to quickly cut off the electrical connection between the electrode **48** and the land **40***a* when the excess current flows through the cut-off portion **74** of the fuse terminal **46***a*.

As above, the function for cutting off the excess current (the short-circuit current) caused by the short-circuit fault of the electronic part **28***a* is realized not by a pattern fuse formed in the printed board **26** but by the fuse terminal **46***a* for the electronic part **28***a*. As a result, it becomes possible to commonalize and/or standardize the printed boards **26**, which can be commonly used for the different types of the electronic control units. Therefore, it is possible to provide variation products, for which the same printed boards **26** can be used but different electronic parts **28***a* are mounted to the printed board.

In addition, it is possible to make the size of the printed board **26** as well as the electronic control unit **10** smaller by such a volume corresponding to the pattern fuse, which is not necessary in the present embodiment.

In the fuse wiring member **56***a*, the cut-off portion **74** is formed as a part of the connecting portion **68**, which connects the electrode-connected portion **64** to the land-connected portion **66**. Therefore, the cut-off portion **74** is not in contact with the board surface **26***a* of the printed board **26** but located at the position above and separated from the board surface **26***a*. It is, therefore, possible to avoid a situation that melted-down metal spreads over the board surface **26***a* and melted-down portions of the cut-off portion **74** are connected again.

In particular, according to the present embodiment, the wiring function for electrically connecting the electrodes **48** and **50** to the lands **40***a* and the supporting function for supporting the main body **44** are separately provided by the wiring members **56** and the supporting members **58**. In other words, the main body **44** is supported by the supporting members **58** at the position above the board surface **26***a*, independently whether the cut-off portion **74** is melted down or not. Accordingly, it is possible to support the main body **44** by the supporting members **58** even when the cut-off portion **74** of the fuse wiring member **56***a* is melted down. It is, therefore, possible to more effectively prevent the re-connection of the fuse wiring member **56***a*.

In addition, the leg portion **62** of the supporting member **58**, in particular, the vertical wall portion **62***c* is elastically deformable in the X-direction, in which the electrodes **48** and **50** are arranged. When a difference of expansion and contraction (a relative displacement) is generated between the printed board **26** and the main body **44** by a difference of linear coefficient of expansion, the leg portion **62** is elastically deformed. FIG. **7** shows a condition in which the printed board **26** is expanded in the X-direction relative to the main body **44** as a result of increase of ambient temperature. As shown in FIG. **7**, the vertical wall portion **62***c* of the leg portion **62** is elastically deformed. In FIG. **7**, dotted lines show the positions of the respective vertical wall portions **62***c* before the elastic deformation. As above, by the leg portions **62** of the supporting members **58**, it is possible to reduce stress applied to connected areas between the wiring members **56** and the electrodes **48** and **50** and stress applied to connected areas between the wiring members **56** and the lands **40***a*. Accordingly, it is possible to increase reliability of electrical and mechanical connection at those connected areas.

In each of the wiring members **56**, the connecting portion **68** is outwardly expanded from a virtual line connecting the electrode-connected portion **64** and the land-connected portion **66** with each other. In other words, the connecting portion **68** is outwardly convexed in the direction opposite to the main body **44**. According to the above structure, it is possible that the connecting portion **68** is also elastically deformed depending on the leg portion **62**, when the printed board **26** is expanded and the leg portion **62** is correspondingly deformed. Since the connecting portion **68** has a flexible structure for absorbing the elastic deformation of the leg portion **62** as above, it is possible to further increase reliability for the mechanical and electrical connection between the electrodes **48** and **50** and the lands **40***a*.

The connecting portion **68** has the V-shaped bent portion **72**. It is easy to manufacture the wiring member **56** having the connecting portion **68** of such a shape and it is easy to control the shape of the wiring member **56**.

The cut-off portion **74** is supported at the position above and separated from the board surface **26***a* of the printed board **26**, in the condition that the fuse terminal **46***a* is connected to the land **40***a*. Therefore, the heat of the cut-off portion **74** does not directly go away to the printed board **26**. It is, thereby, possible to shorten a time period between the short-circuit failure of the electronic element formed in the main body **44** and the melt-down of the cut-off portion **74**. In other words, the response for the short-circuit failure is improved. In addition, since it is possible to reduce variation of the response performances, accuracy for cutting-off performances can be improved.

In a case that the response is improved by the pattern fuse, it is necessary to make the pattern fuse thinner than other portions of the wiring patterns or to make the pattern fuse with such material which is more easily melted down than the other portions of the wiring patterns. However, the above method increases manufacturing cost.

According to the present embodiment, since the heat of the cut-off portion **74** is not easily transferred to the printed board **26**, it is possible not only to improve the response but also to reduce the manufacturing cost. Furthermore, since the heat of the cut-off portion **74** is not easily transferred to the printed board **26**, it is possible to loosen up designing of heat-resisting performance for the printed board **26**. The manufacturing cost is correspondingly further reduced.

In the printed board having the pattern fuses, heat generated at electronic parts neighboring to one pattern fuse and/or heat generated at other pattern fuses adjacent to the one pattern fuse is transferred to the one pattern fuse via the insulating board and the wiring patterns. Since the pattern fuse is influenced by the heat generated at portions surrounding the pattern fuse, the pattern fuse may be melted down before the short-circuit fault occurs in the electronic part, in a case of a high-density packaging.

According to the present embodiment, however, since the cut-off portion **74** is held at the position above and separated from the board surface of the printed board **26**, the cut-off portion **74** is not easily influenced by the heat of the other electronic parts **28**. It is, therefore, possible to realize the high-density packaging. In other words, the size of the printed board **26** can be reduced and thereby the manufacturing cost can be correspondingly reduced.

In the electronic control unit **10**, at least some of the multiple electronic parts **28***a* having the fuse terminals **46***a* are connected to the power-source wiring pattern **40***b* via the lands **40***a* and the connecting wiring patterns **40***c*. As already explained above, when the short-circuit fault occurs in one of the electronic parts **28***a* and the excess current flows in the fuse terminal **46***a*, the connection between the electrode **48** and the land **40***a* is immediately cut off by the melt-down of the cut-off portion **74** of the fuse terminal **46***a* (which has connected the electrode **48** and the land **40***a* before the melt-down). Accordingly, it is possible to protect the other electronic parts **28** connected to the power-source wiring pattern **40***b* from the excess current.

The excess current flowing in the fuse terminal **46***a* for cutting off the cut-off portion **74** is not so large as the excess current for cutting off the main fuse **34**. Therefore, it is possible to suppress adverse influence, which may be caused by the excess current flowing in the fuse terminal **46***a*, to power-supply to the other electronic devices.

In the present embodiment, the electronic part **28***a* includes the ceramic-type laminated capacitor. In a case that the electronic part **28***a* of the laminated structure is used, the size of the electronic part **28***a* can be made smaller and the high-density packaging for the printed board **26** can be realized. However, on the other hand, the electronic part having the laminated structure may have a problem that the electric conductor layers **54** (which are laminated in multiple layers) are likely to be short-circuited by vehicle vibration and/or heat stress. In the present embodiment having the electronic part **28***a* of the laminated structure, however, it is possible to rapidly cut off the electrical connection between the electrode **48** and the land **40***a*, if the short-circuit fault occurs.

The battery of a lithium system is more advantageous than a lead battery in view of power supplying capability. On the other hand, the lithium battery has such a disadvantage that it will be quickly deteriorated when current larger than a rated output current is supplied to electric loads. According to the present embodiment, however, the electrical connection between the electrode **48** and the land **40***a* is immediately cut off by the fuse terminal **46***a* in the case of short-circuit in the electronic part **28***a*. It is, therefore, possible to suppress adverse influence to the battery to a minimum value.

In the present embodiment, the connecting portion **68** of the wiring member **56** is formed in the V-letter shape. However, the shape of the connecting portion **68** should not be limited to the V-letter shape. Any other shapes can be applied to the connecting portion **68**. For example, as shown in FIGS. **8**A and **8**B, an intermediate portion of the connecting portion **68** is expanded in the direction opposite to the main body **44** (in other words, the intermediate portion of the connecting portion **68** is outwardly convexed in the X-direction) from the virtual line connecting the electrode-connected portion **64** and the land-connected portion **66** with each other.

In FIG. **8**A, the connecting portion **68** is formed in a U-letter shape having two bent portions **72**. In FIG. **8**B, the connecting portion **68** is formed in a C-letter shape or an arc shape having no bent portion.

In the present embodiment, the leg portion **62** has the vertical wall portion **62***c* and the seat portion **62***d*. It is not always necessary to provide the seat portion **62***d*. Namely, the supporting member **58** may have only the leg portion **62** extending from the holding portion **60** toward the printed board **26** and a forward end of the leg portion **62** is in contact with the board surface **26***a* of the printed board **26**.

Second Embodiment

A second embodiment of the present disclosure will be explained with reference to FIGS. **9** and **10**. Explanation for those portions, which are similar to or the same to those of the first embodiment (including the electronic part **28***a*, the electronic control unit **10** and so on), will be omitted.

As shown in FIGS. **9** and **10**, each of the leg portions **62** (the first leg portion **62***a* and the second leg portion **62***b*) extends from a common holding portion **60** toward the printed board **26**. The fuse wiring member **56***a* and the normal wiring member **56***b* are provided in a common terminal unit **46**.

In the present embodiment, the supporting member **58** is made of the resin material, except for the fixing portion **70**. The holding portion **60** is composed of a base portion **60***b* which is in contact with the lower-side surface **44***a* of the main body **44**, a pair of wall portions **60***c* each of which extends from the base portion **60***b* in the Z-direction opposite to the printed board **26**, and a pair of claw portions **60***d* which is brought into contact with the upper-side surface **44***b* of the main body **44**.

The base portion **60***b* is formed in a flat plate shape having a rectangular surface corresponding to the lower-side surface **44***a* of the main body **44**, wherein the rectangular surface is in parallel to a plane defined by the X-direction and the Y-direction.

The holding portion **60** has the pair of wall portions **60***c*, which are opposing to each other in the Y-direction so that each of the wall portions **60***c* faces to and is respectively in contact with the third and fourth side surfaces of the main body **44**. The main body **44** is held between the pair of the wall portions **60***c* in the Y-direction.

One of the claw portions **60***d* extends from a forward end (an upper end) of the wall portion **60***c* (on an opposite side to the base portion **60***b*) in the Y-direction to the claw portion **60***d* of the other side. A space is formed between the pair of the claw portions **60***d* in the Y-direction. The main body is held between the base portion **60***b* and the claw portions **60***d* in the Z-direction.

The leg portion **62** has the first leg portion **62***a* and the second leg portion **62***b*. The first leg portion **62***a* extends in the Z-direction from a longitudinal end of the base portion **60***b*, which (the longitudinal end) is closer to the electrode **48**, toward the printed board **26**. The second leg portion **62***b* likewise extends in the Z-direction from another longitudinal end of the base portion **60***b*, which (the other longitudinal end) is closer to the electrode **50**, toward the printed board **26**.

Each of the first and second leg portions **62***a* and **62***b* has a structure corresponding to the vertical wall portion **62***c* of the leg portion **62** of the first embodiment. A thickness of the leg portion **62** (**62***a*, **62***b*) in the X-direction is made smaller so that the leg portion is elastically deformed. Each of the leg portions **62** has a cross section of a U-letter shape on a plane defined by the X-direction and the Y-direction.

When the electronic part **28***a* is manufactured, the following parts are prepared at first, as in the same manner to the first embodiment;

- the main body **44** having the electrodes **48** and **50**;
- the supporting member **58**; and
- the wiring members **56** (the fuse wiring member **56***a* and the normal wiring member **56***b*).

The supporting member **58** is attached to the main body **44**. More exactly, each of the wall portions **60***c* and the claw portions **60***d* is outwardly and elastically bent by a bending force so that the claw portions **60***d* are separated from each other in the Y-direction. Then, the main body **44** is arranged between the wall portions **60***c* and between the base portion **60***b* and the claw portions **60***d*. The bending force is released from the wall portions **60***c* and the claw portions **60***d*, so that the claw portions **60***d* are brought into contact with the upper-side surface **44***b* of the main body **44**.

The electrode-connected portion **64** of the fuse wiring member **56***a* is soldered to the electrode **48** formed on the first side surface **44***c* of the main body **44**, while the land-connected portion **66** is soldered to the fixing portion **70** of the first leg portion **62***a*. In a similar manner, the electrode-connected portion **64** of the normal wiring member **56***b* is soldered to the electrode **50** formed on the second side surface **44***d* of the main body **44**, while the land-connected portion **66** is soldered to the fixing portion **70** of the second leg portion **62***b*. The electronic part **28***a* is thus completed.

The same advantages to those of the first embodiment can be obtained in the electronic part **28***a* of the second embodiment.

In the present embodiment, since the multiple wiring members **56** (**56***a*, **56***b*) are connected to one common supporting member **58**, a number of assembling processes for the electronic part **28***a* can be reduced.

The present disclosure should not be limited to the above embodiments but can be modified in various manners without departing from the spirits of the present disclosure.

In the above embodiments, one of the wiring members **56** is composed of the fuse wiring member **56***a* having the cut-off portion **74**. However, the number of the fuse wiring member should not be limited to one for one electronic part **28***a*. For example, all of the wiring members may be composed of the fuse wiring members **56***a*.

In such a case, even when not only the cut-off portion **74** connected to the electrode **48** but also the cut-off portion **74** connected to the electrode **50** is melted down, the main body **44** can be held at the position above the board surface by the supporting member(s) **58**. Accordingly, it is possible to prevent the re-connection of the fuse wiring member **56***a*.

In the above embodiments, one wiring member **56** is connected to each of the electrodes **48** and **50**. However, a number of the wiring member to be connected to one electrode **48** or **50** should not be limited to one. For example, multiple fuse wiring members **56***a* may be connected to the electrode **48**. Alternatively, multiple normal wiring members **56***b* may be connected to the electrode **50**.

In the above embodiments, the ceramic-type laminated capacitor is explained as the example for the electronic part **28***a*. However, the above structures may be applied to any other types of the electronic elements. For example, a laminated inductor may be used as the electronic element having the laminated structure.

Furthermore, the above structure should not be limited to the electronic elements having the laminated structure but can be applied to any other types of the electronic elements, for example, such an electronic element having more than two electrodes, such as a multiple-chip resistor.

A number of the leg portions **62** should not be equal to that of the electrodes **48** and **50**. For example, in the first embodiment, the fuse terminal **46***a* may have two first leg portions **62***a*, each of which extends from the holding portion **60**. And at least one of the first leg portions **62***a* is formed with the fixing portion **70***c* (the land-connected portion **66**) to be connected to the land **40***a*.

In the above embodiments, the supporting member **58** has the fixing portion **70**. However, it is not always necessary that the fixing portion **70** is provided in the supporting member **58**. In a case of the supporting member having no fixing portion **70**, the land-connected portion **66** of the wiring member **56** may be connected to the leg portion **62** made of the resin material by adhesive material.

In addition, in the above embodiments, the supporting member **58** is made of the resin material, except for the fixing portion **70**. The material for the supporting member **58** should not be limited to the resin material. For example, the supporting member **58** may be made of electrically insulating material other than the resin material. More exactly, a contacting

portion of the supporting member **58**, which is in contact with the main body **44**, may be made of the electrically insulating material. And the leg portion **62** may be made of such material for allowing the elastic deformation of the leg portion **62** in the direction, in which the electrodes **48** and **50** are arranged. As above, the supporting member **58** may be made of the electrically insulating material other than the resin material and the supporting member **58** may include a portion made of metal material, such as the fixing portion **70**. However, when the supporting member **58** is made of the resin material like the above embodiments, it becomes easier to have the supporting function for supporting the main body **44** and it becomes easier to make the leg portion **62** which is flexible and elastically deformable.

In the above embodiments, the electronic part **28***a* having the fuse terminal **46***a* is electrically connected to the power-source wiring pattern **40***b* (connected to the battery **36**) via the land **40***a* and the connecting wiring pattern **40***c*. However, the electronic part **28***a* having the fuse terminal **46***a* may be electrically connected to other wiring patterns than the power-source wiring pattern.

What is claimed is:

1. An electronic part mounted to a printed board comprising:

a main body arranged at a position above and separated from a board surface of the printed board, the main body having at least one electronic element and multiple electrodes for the electronic element; and

a terminal for supporting the main body at the position above and separated from the board surface of the printed board, the terminal electrically connecting each of the electrodes to respective lands formed in the printed board,

wherein the terminal comprises:

a supporting member made of electrically insulating material and having one end in contact with the main body and another end in contact with the board surface of the printed board in order to support the main body at the position above and separated from the board surface; and

a wiring member having an electrode-connected portion connected to one of the corresponding electrodes of the main body and a land-connected portion soldered to the land in a condition that the main body is supported at the position above and separated from the board surface,

wherein the supporting member comprises:

a holding portion made of the electrically insulating material and being in contact with the main body for holding the main body;

a leg portion extending from the holding portion to the printed board, the leg portion being elastically deformable in a direction in which the multiple electrodes are arranged,

wherein the wiring member comprises:

the electrode-connected portion electrically and mechanically connected to the corresponding electrode of the main body;

the land-connected portion connected to the leg portion and soldered to the land; and

a connecting portion for electrically connecting the electrode-connected portion to the land-connected portion,

wherein the wiring member is composed of a fuse wiring member, and

wherein the fuse wiring member has a cut-off portion, which is formed at least as a part of the connecting portion and which has a width smaller than that of other portions of the connecting portion, so that the cut-off portion is melted down depending heat generated by excess current in order to cut off the excess current.

2. The electronic part according to claim **1**, wherein

the connecting portion is outwardly expanded in a direction opposite to the main body from a virtual line connecting the electrode-connected portion and the land-connected portion with each other.

3. The electronic part according to claim **2**, wherein

the connecting portion has a bent portion at a top of a convexed shape, in which the bent portion is outwardly expanded.

4. The electronic part according to claim **1**, wherein

the main body is formed in a rectangular shape on a plane in parallel to the surface board of the printed board,

the multiple electrodes are composed of a first electrode formed at a first side surface of the main body and a second electrode formed at a second side surface of the main body, wherein the second side surface is formed at an opposite side to the first side surface,

the electronic part includes multiple wiring members, which are composed of a first wiring member connected to the first electrode and a second wiring member connected to the second electrode,

the electronic part includes multiple leg portions, which are composed of a first leg portion to which the first wiring member is connected and a second leg portion to which the second wiring member is connected, and

each of the first and the second leg portions is elastically deformable in a direction, in which the first and the second side surfaces are arranged.

5. The electronic part according to claim **1**, wherein

the terminal is composed of a terminal unit having a common supporting member, and

the supporting member has multiple leg portions, each of which extends from the common supporting member toward the board surface of the printed board.

6. The electronic part according to claim **1**, wherein

the terminal is composed of a fuse terminal having the fuse wiring member and a normal terminal having a normal wiring member, and

each of the fuse terminal and the normal terminal has the holding portion and the leg portion extending from the holding portion toward the board surface of the printed board.

7. An electronic control unit comprising:

the electronic part according to claim **1**; and

a printed board having a land connected to a terminal of the electronic part.

8. An electronic part mounted to a printed board comprising:

a main body arranged at a position above and separated from a board surface of the printed board, the main body having at least one electronic element and multiple electrodes for the electronic element; and

at least two terminals for supporting the main body at the position above and separated from the board surface of the printed board, each of the terminals electrically connecting each of the electrodes to respective lands formed in the printed board,

wherein each of the terminals comprises:

a supporting member made of electrically insulating material and having one end in contact with the main body and another end in contact with the board surface of the printed board in order to support the main body at the position above and separated from the board surface; and

a wiring member having an electrode-connected portion connected to one of the corresponding electrodes of the main body and a land-connected portion soldered to the land in a condition that the main body is supported at the position above and separated from the board surface,

wherein the supporting member comprises:

a holding portion made of the electrically insulating material and being in contact with the main body for holding the main body;

a leg portion extending from the holding portion to the printed board, the leg portion being elastically deformable in a direction in which the multiple electrodes are arranged,

wherein the wiring member comprises:

the electrode-connected portion electrically and mechanically connected to the corresponding electrode of the main body;

the land-connected portion connected to the leg portion and soldered to the land; and

a connecting portion for electrically connecting the electrode-connected portion to the land-connected portion,

wherein one of the wiring members is composed of a fuse wiring member, and

wherein the fuse wiring member has a cut-off portion, which is formed at least as a part of the connecting portion and which has a width smaller than that of other portions of the connecting portion, so that the cut-off portion is melted down depending heat generated by excess current in order to cut off the excess current.

9. An electronic part mounted to a printed board comprising:

a main body arranged at a position above and separated from a board surface of the printed board, the main body having at least one electronic element and multiple electrodes for the electronic element; and

a terminal unit for supporting the main body at the position above and separated from the board surface of the printed board and electrically connecting each of the electrodes to respective lands formed in the printed board,

wherein the terminal unit comprises:

a supporting member made of electrically insulating material and having one end in contact with the main body and another end in contact with the board surface of the printed board in order to support the main body at the position above and separated from the board surface; and

a first and a second wiring members, each having an electrode-connected portion connected to one of the corresponding electrodes of the main body and a land-connected portion soldered to the land in a condition that the main body is supported at the position above and separated from the board surface,

wherein the supporting member comprises:

a common holding portion made of the electrically insulating material and being in contact with the main body for holding the main body;

a first and a second leg portions, each extending from the common holding portion to the printed board, each of the leg portions being elastically deformable in a direction in which the multiple electrodes are arranged,

wherein each of the first and the second wiring members comprises:

the electrode-connected portion electrically and mechanically connected to the corresponding electrode of the main body;

the land-connected portion connected to the corresponding leg portion and soldered to the land; and

a connecting portion for electrically connecting the electrode-connected portion to the land-connected portion,

wherein the first wiring member is composed of a fuse wiring member, and

wherein the fuse wiring member has a cut-off portion, which is formed at least as a part of the connecting portion and which has a width smaller than that of other portions of the connecting portion, so that the cut-off portion is melted down depending heat generated by excess current in order to cut off the excess current.

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